

“On the Liquefied Hydrides of Phosphorus, Sulphur, and the Halogens, as Conducting Solvents.—Part II.” By E. H. ARCHIBALD and D. MCINTOSH. Communicated by Sir WILLIAM RAMSAY, K.C.B., F.R.S. Received April 26,—Read May 19, 1904.

In continuation of the preceding investigation,\* a very large number of substances have been examined with regard to their solubility in the four substances—hydrogen chloride, bromide, iodide, and sulphide.

The following is a brief summary of the results which have been so far obtained :—

No salt of the metals has been found to dissolve in more than traces in either solvent, and in no case was it certain that such substances dissolved at all. We cannot, therefore, confirm the observation of Helbig and Fausti,† who state that stannic chloride dissolves in liquid hydrogen chloride, but does not form a conducting solution.

On the other hand, many organic substances were found to be readily soluble; as for example, the amine salts, acid amides, and certain alkaloids among compounds containing nitrogen; and alcohols, ethers, ketones, phenols, and some organic acids and esters among compounds containing oxygen.

In every case where a conducting solution was formed the dissolved substance was one containing an element the valence of which might be increased, thus dyad oxygen or sulphur becoming tetrad, or triad nitrogen becoming pentad.

The conductivity of a large number of solutions was measured, and in all cases the molecular conductivity increased enormously with concentration. No case has been met with in which the molecular conductivity varies in the same way as in aqueous solutions. The substances rarely conduct better than  $n/25$  KCl.

A few of the measurements are given in the following table, in which the concentration C is given in gramme molecules per litre, and the conductivity in reciprocal ohms  $\times 10^{-6}$ .

Substance.	Solvent.	C.	Conductivity.
Acetamide .....	HBr	0·011	65·2
“ .....	“	0·713	3155·0
Acetonitrile.....	HCl	0·0463	1512·0
“ .....	“	1·232	9636·0
Ethyl oxide.....	HI	0·10	19·5
“ .....	“	1·14	2208·0
Triethyl ammonium chloride...	H <sub>2</sub> S	0·014	117·0
“ .....	“	0·401	1580·0

\* *Ante*, p. 450.

† ‘*Zeit. für Angewandte Chemie*,’ vol. 17, 1904.

A large number of temperature coefficients have been measured. These were found to be in the majority of cases positive, *i.e.*, the conductivities increase with rise of temperature.

All the experiments which have been hitherto carried out lead to the conclusion that it is the dissolved substances (*i.e.*, the acetamide, etc.) which carries the current and not the halogen hydride. In other words, we are dealing with solutions in which the organic and not the inorganic substance undergoes electrolytic dissociation.

Further experiments are at present in progress, having for their object the measurement of the molecular weight of the dissolved substances (McIntosh and Archibald) and the determination of the transport numbers (Steele).

Discussion of the results so far obtained is deferred until these experiments are completed.

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“Note on the Lymphatic Glands in Sleeping Sickness.” By Captain E. D. W. GREIG, I.M.S., and Lieutenant A. C. H. GRAY, R.A.M.C. Communicated by Colonel BRUCE, F.R.S., at the desire of the Sleeping Sickness Commission. Received and Read May 5, 1904.

Captain Greig, in a letter dated March 17, 1904, writes that following a suggestion of Dr. Mott, they have examined the contents of lymphatic glands during life from fifteen sleeping-sickness patients. In all of them actively motile trypanosomes were very readily found in cover-glass preparations taken from the cervical glands. They were also present in other glands such as the femoral, but were not nearly so numerous.

They found the trypanosomes to be far more numerous in the glands than in the blood or cerebro-spinal fluid, and believe that the examination of fluid removed from lymphatic glands will prove to be a much more rapid and satisfactory method of diagnosing early cases of sleeping sickness than the examination of the blood.

At first the glands were excised, but this was soon found to be unnecessary, as it is easy to puncture a superficial gland with a hypodermic syringe and suck up some of the juice into the needle and blow this out on a slide. The actively moving trypanosomes were readily found after a short search in these slides, when a prolonged search in similar preparations of the blood from the finger failed to discover them. In stained specimens, in addition to well-formed trypanosomes, there exist many broken-down remains, which suggests that a destruction of the trypanosomes takes place in the glands.